Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

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Abstract
"Artificial intelligence (AI) and machine learning (ML)" are becoming increasingly popular tools in the field of marketing, allowing businesses to better understand and predict the preferences of their target customers. This paper explores the effectiveness of AI and ML-based approaches in predicting customer preferences for various marketing strategies throughout the customer lifecycle. Through the analysis of previous research, the paper highlights the benefits of using AI and ML in customer targeting, including the ability to analyze large amounts of data, provide personalized recommendations, and predict future behavior. The paper also discusses some of the challenges and ethical considerations around the use of customer data and privacy. Also the findings suggested that AI and ML-based approaches can significantly improve the effectiveness of customer targeting and lead to higher customer engagement and satisfaction. However, it is important for businesses to ensure that they are using customer data ethically and transparently, and to provide customers with the option to opt-out of data collection and targeting.
Keywords: Artificial Intelligence (AI), Machine Learning (ML), Marketing, Strategies, Customers

Introduction

The application of artificial intelligence (AI) in marketing holds a significant amount of untapped potential that has not yet been explored to develop sophisticated and original algorithmic solutions. The relationship between users and brands is undergoing a sea change as a result of the advent of AI. Whether or not this technology will be useful is highly dependent, not only on the kind

717

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727

Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

of website that is being used, but also on the kind of business that is being run. Marketers are in a better position than they have ever been to focus their undivided attention on meeting the requirements of their customers. They are able to quickly determine what content to target customers with when they use AI, and the data that is gathered and generated by its algorithms allows them to pinpoint the best channel to use at any given time. When a user's experience is personalized for them using artificial intelligence, they are more likely to make a purchase because of the enhanced quality of the experience. Tools based on artificial intelligence can also be used to evaluate the effectiveness of campaigns run by competitors by discovering what customers were expecting to see from those campaigns. The field of artificial intelligence known as machine learning (ML) instructs computers on how to learn how to analyze and interpret data on their own. Additionally, ML assists people in efficiently solving problems in a variety of contexts. The algorithm is able to "learn" from new information, which ultimately results in improved functionality and accuracy.

The use of artificial intelligence (AI) is destined to one day be standard practice in all commercial enterprises across the globe. Recent advances in AI-driven automation mirror the significant shifts that have taken place in the field of artificial intelligence. Recent research (S. Verma, et.al., 2021); (S. Dimitrieska, et.al., 2018); (U. Arsenijevic, et.al., 2019) demonstrates that there has been a shift in the way that businesses view, use, and invest in artificial intelligence. Having such a sophisticated system be able to recognize people and things has far-reaching implications for a variety of different industries. The use of facial recognition software by security personnel can help them differentiate between individuals. Object detection is a method that allows for the examination and differentiation of images. The same way that cookies can learn about a user's preferences, AI can process human images to do the same thing and then tailor its service accordingly. Some companies are investigating whether or not it is possible to use facial recognition software to determine the state of mind of a customer and then tailor their recommendations accordingly (X. Yang, et.al., 2021); (P. Jain, et.al., 2020).

Intelligence (AI) developed in a laboratory setting. The study and development of computational systems that are intelligent enough to carry out mental tasks on par with those performed by humans is what is referred to as "artificial intelligence" (AI for short). Just a few examples include the capabilities of language interpretation, face recognition, voice recognition, and the ability to make difficult decisions when confronted with complex issues. (A publication from Oxford University Press that was released in 2019).

The process of a computer acquiring knowledge without being explicitly programmed to do so by a human being is referred to as machine learning, or ML for short. This demonstrates that machines are capable of recognizing patterns in the data that is collected by their detectors and drawing conclusions about the world that they are surrounded by. 2018 edition of Buller, Gifford, and Mills.

Need for AI & ML in marketing strategies

The use of "Artificial Intelligence (AI) & Machine Learning (ML)" are now indispensable components of contemporary marketing strategies. The following are some of the reasons why:

- A personalized experience can be crafted for each individual customer through the use of AI and ML algorithms, which can analyze data provided by customers. Through an understanding of customer preferences, behavior, and previous purchase history, marketing that is powered by AI is able to personalize the message, timing, and offer to meet the specific requirements of each individual customer.

718

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727

Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

- Automating repetitive marketing tasks like email marketing, advertising on social media, and customer service can be accomplished with the help of AI and ML. This enables marketers to redirect their attention to strategic endeavors and activities with a higher value.
- Algorithms based on AI and ML are capable of analyzing vast amounts of data in order to discover patterns and insights that humans might overlook. Marketers are able to improve the effectiveness of their campaigns and their return on investment (ROI) by making use of this data.
- Artificial intelligence and machine learning can assist marketers in predicting the behavior and preferences of customers, which enables them to anticipate customers' future requirements and adapt their marketing strategies accordingly.
- By automating tasks, improving targeting, and increasing ROI, AI and ML have the potential to lower the costs associated with marketing.

Theoretical background of (AI) and (ML) in predicting customer preferences for various marketing strategies

(AI) and (ML) in predicting customer preferences for various marketing strategies draws on several key concepts and theories from different fields. Here are some of the key theoretical frameworks relevant to this topic:

Customer Behaviour Theory: This theory posits that consumer behavior is influenced by a complex interplay of factors, including cultural, social, and personal factors. AI and ML-based approaches can help identify patterns and relationships between these factors and customer preferences, leading to more effective targeting.

Decision Theory: This theory is concerned with how people make decisions and what factors influence those decisions. AI and ML-based approaches can help identify patterns in customer decision-making and provide insights into what factors are most important in shaping those decisions.

Personalization Theory: This theory posits that customers respond better to marketing messages that are tailored to their individual preferences and needs. AI and ML-based approaches can provide highly personalized marketing campaigns based on individual customer behavior and preferences.

Data Mining Theory: This theory is concerned with the process of extracting useful insights and patterns from large and complex data sets. AI and ML-based approaches use data mining techniques to analyze vast amounts of customer data and identify patterns and relationships between different data points.

Machine Learning Theory: This theory is concerned with how machines can learn from data and improve their performance over time. AI and ML-based approaches use machine learning algorithms to learn from customer data and improve the accuracy of customer targeting over time.

AI and ML-based approaches in predicting customer preferences draws on a range of theories from different fields, including customer behavior theory, decision theory, personalization theory, data mining theory, and machine learning theory. By leveraging these theories and approaches, businesses can improve the effectiveness of their marketing strategies and better target their customers.

Review Literature

Wichert (2020) investigates the use of AI in both quantum computing as well as machine learning. It aids in the speedy discovery of answers to difficult questions. Generated Adversarial Networks (GANs), as argued by Reig-Bolao (2013), are a significant advancement in the study of AI. There are a number of ethical concerns that GANs help to alleviate (Reig-Bolao et al., 2013). Algorithmic designs applied to the creation of neural networks allow for the creation of a fantastical universe. Next, a discriminator system is connected to the network after a vector is transformed into

719

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727

Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

an audio or visual matrix. A discriminator network is used to determine the authenticity of a piece of content.

The term "artificial intelligence" (or "AI") refers to a computer's ability to mimic human intelligence and behavior. Reasoning, generalization, interpretation, and experience-based learning all fall under this category. AI, or artificial intelligence, is defined as a machine's ability to learn and mimic or simulate intelligent human behavior. Meanwhile, machine learning is a branch of AI that employs algorithmic analysis of data and information to reveal previously unseen relationships. The machine learning system can transform automatic speech into a linguistically conveyed semantic structure. The effectiveness of marketing operations at every customer touchpoint is also enhanced by machine learning. To reliably predict how customers will act in the future, it is necessary to use supervised learning to establish a foundation for processing data in the future. Supervised learning is a learning model built to make predictions in the face of unexpected input instances, as stated by Kotu and Deshpande (2019). In response to a dataset, its algorithm constructs a classification model that can be used to drive additional data processing. Thus, with the help of machine learning and supervised learning, AI can provide insightful data to predict the actions of individuals or groups in the here-and-now by employing the power of automation.

The primary objective of artificial intelligence (AI) is to create software that can mimic a human mind by solving problems, learning, and making decisions in a way that is similar to how humans do it. Artificial intelligence has been the subject of several previous studies that explored its potential role in enhancing business efficiency. However, "Vanneschi et al. (2018)" built a model to anticipate the probability of a payment default in digital marketplace deals. The risk of default was central to this model's analysis. Meanwhile, in 2012, Omoteso focused on how to build AI systems for use in auditing. Internal control systems and audit committee effectiveness were also reportedly evaluated with the help of AI (Lo and Campos, 2018).

Emails are written for many different reasons, including thanking a new customer, fostering a relationship, or promoting a product (Sterne, 2017). The tools of AI make it possible to study which kinds of emails are most productive in terms of contributing to the growth of a business. Zeta Global's (2019) artificial intelligence (AI) solution frees up marketers to focus on long-term customer relationships rather than constant content production for email marketing efforts. With the help of AI, businesses can get to know their customers on a deeper, more individual level. This enables the company's marketers to select the best timing, create customer segments, and evaluate content based on their individual preferences. Chowhound took advantage of this window of opportunity to fortify its operations, and as a result, the percentage of users who opened their emails increased by nearly 30%, and the number of users who clicked on their emails increased by nearly 150% (Sterne, 2017).

According to Mari (2019), marketing is one of the fields that can gain the most from incorporating AI. A large part of a marketer's job is to conduct research to determine customer needs, match those needs to available products and services, and ultimately persuade customers to make purchases (Mari, 2019). According to a 2018 McKinsey study of more than 400 use cases employing advanced AI techniques, marketing holds the most potential for AI. There is potential for a substantial uptick in revenue with the help of an AI-powered marketing and business strategy (Mari, 2019). Huang and Rust (2021) state that AI-driven marketing employs cutting-edge tech to better the shopper's experience and the customer's journey as a whole. Customers' moods, purchases, travels, and other activities are all tracked using AI so that the company can better serve them. Machine learning algorithms incorporate this data into forecasts of future customer behavior (Huang & Rust, 2021). (Huang and Rust, 2021) Strategies for boosting customer involvement and loyalty will make use of individualization in the form of data-driven insights, recommendations, and communications. Artificial intelligence has the potential to cut costs, boost profits, and increase customer happiness

720

(Huang & Rust, 2021). All of these are things that AI is aiming for. Despite its lack of emotional intelligence, artificial intelligence (AI) has many practical applications. According to research ("Huang & Rust, 2021"),. (Huang and Rust, 2021) Reduces the number of mistakes made in digital marketing through streamlining, optimizing, and reporting on marketing campaigns based on data. Customized email marketing is something many of us are familiar with, and according to Huang and Rust (2021), AI is largely responsible for this. Chatbots, as described by Chaffey and Ellis-Chadwick (2019), are a prime example of AI applications that mimic human intelligence by understanding and addressing customer queries and facilitating their online purchases. The implementation of chatbots is currently on the rise. Polson and Scott (2018) state that many businesses now use Meta Messenger or their own websites to incorporate bots into their operations. The primary motivation for implementing a chatbot is usually to boost the efficiency of a company's customer service department. However, Meta Messenger's data analysis features can help a business maximize the effectiveness of its digital marketing initiatives. according to (Chaffey & Ellis Chadwick, 2019).

Research Methodology

Relevant secondary data for analysis based on conceptual critical analysis, which may include customer data such as demographic information, purchase history, website behaviour, and social media activity. The research is descriptive in nature. Secondary data has been taken from various websites, published research papers & books.

Problem Statement

The ability to quickly and effectively act on one's knowledge of customers' wants and interests is essential for success in modern marketing, along with an in-depth understanding of those customers. The vast majority of companies are unable to generate data-driven decisions in real time because they have not integrated AI and ML into their marketing strategies. (Camilleri, 2017). The process of personalization involves the collection of a vast amount of data, which subsequently enables businesses to improve their ability to recognize consumer behaviour and interests across a variety of platforms and touchpoints, and consequently improve their ability to match customer interests with appropriate content and increase sales ("Dwivedi Y. K, 2020"). This is especially true when customers are involved at every stage of the e-commerce process, from initial research to final use ("Mangiaracina et al., 2009"). Additionally, there is a great deal of confusion regarding the definition of personalization in the realm of e-commerce, despite the fact that a great deal of vendors assert that they provide this service.

Research gap

The research gap for this topic is extremely large, and there are a great deal of holes in the knowledge that is available to anyone who is interested in learning more about the subject. The research on AI and ML marketing strategies appears to be dispersed across a few different publications; however, it does not appear that there is a single article that covers all of the solutions that have resulted from AI-ML and its effects on marketing strategies.

Objective of the Study

- To provide insights into the potential of AI and ML-based approaches in marketing and highlights the importance of using these tools responsibly and critically analysing with a focus on customer needs and preferences.

Comparison Between Traditional Marketing Segmentation Vs AI marketing Segmentation

Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

Traditional marketing segmentation involves dividing a market into groups of customers based on common characteristics such as demographics, behavior, and psychographics. This segmentation is often based on historical data, surveys, and focus groups. On the other hand, AI marketing segmentation involves using algorithms to analyze vast amounts of data and identify patterns and relationships that traditional methods may miss.

Here are some key differences between traditional marketing segmentation and AI marketing segmentation:

Table : Comparison Between Traditional marketing segmentation and AI marketing segmentation

1.	Speed and Efficiency:	AI marketing segmentation can analyze vast amounts of data in real-time, providing more accurate and up-to-date insights compared to traditional methods, which can be time-consuming and require extensive manual analysis.
2.	Personalization:	AI marketing segmentation allows for highly personalized marketing campaigns based on individual customer behavior and preferences, while traditional segmentation typically relies on broader demographic or behavioral characteristics.
3.	Flexibility:	AI marketing segmentation can adapt to changing customer behaviors and preferences in real-time, while traditional segmentation may be based on static historical data that becomes outdated over time.
4.	Accuracy:	AI marketing segmentation can provide more accurate insights by analyzing vast amounts of data from multiple sources, while traditional segmentation may suffer from limited data sets or incomplete information.
5.	Scalability:	AI marketing segmentation can be easily scaled to analyze large and complex data sets, while traditional segmentation may require significant resources and time to analyze.

Discussion & Conceptual Critical Analysis
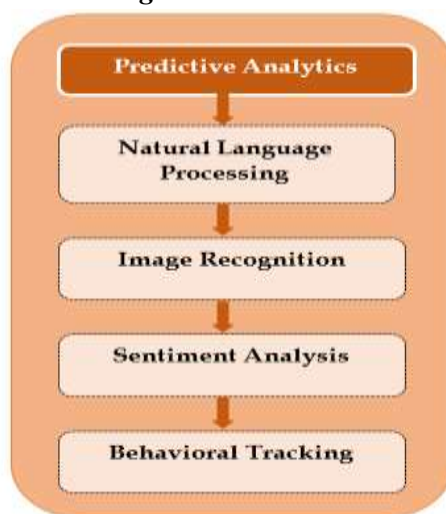
1. Critically analysing that how AI can target customers

Figure 1: How Artificial Intelligence Targets the Customers

722

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727

Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

- ✓ The customer's browsing history, purchase history, and activity on social media can all be analysed by AI algorithms, which can then make predictions about the customer's future behaviour and preferences. The creation of personalized marketing campaigns that are more likely to resonate with specific customers can be made possible for businesses as a result of this.
- ✓ AI-powered chatbots and virtual assistants can interact with customers in natural language, providing personalized recommendations and assistance based on the customer's needs and preferences.
- ✓ AI algorithms can analyze images to identify products or objects, enabling businesses to target customers with personalized recommendations based on their interests and preferences.
- ✓ AI algorithms can analyze customer reviews and social media posts to determine the sentiment of customers towards a product or service. This can enable businesses to identify potential issues and address them proactively.
- ✓ AI algorithms can track customer behavior across various channels, such as websites, social media, and email. This can enable businesses to create personalized marketing campaigns that target customers with relevant offers and messages based on their behavior.

Interpretation : AI can be a powerful tool for targeting customers by providing personalized recommendations, analyzing customer behavior and preferences, and predicting future behavior. This can help businesses to improve customer engagement and satisfaction, as well as increase sales and revenue. However, it is important to ensure that ethical considerations around the use of customer data and privacy are taken into account, and that customers are given the option to opt-out of data collection and targeting.

2. Scale to Measure the Effectiveness of Customer Targeting Across the Entire Customer Lifecycle

The effectiveness of customer targeting throughout the customer lifecycle can vary depending on the specific stage of the lifecycle and the marketing strategy being used.
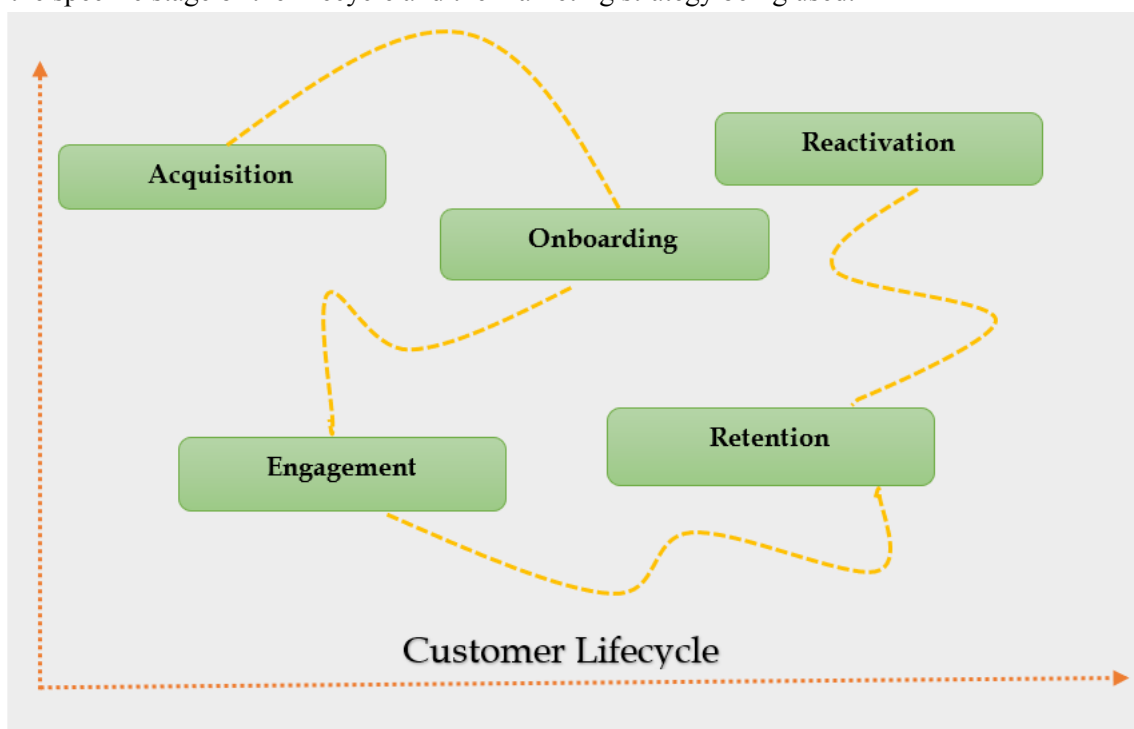

Figure 2: Scale to Measure the Effectiveness of Customer Targeting Across the Entire Customer Lifecycle

723

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727

Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

Critically analysing a rough effectiveness scale for customer targeting throughout the different stages of the customer lifecycle:

- ✓ Customer targeting at the acquisition stage can be highly effective, as businesses can use various channels to reach potential customers who have shown an interest in their products or services. By using data analysis and AI and ML techniques to target these potential customers with personalized messages and offers, businesses can increase the likelihood of converting them into paying customers.
- ✓ Targeting customers during the onboarding stage is also effective, as businesses can use personalized messages and offers to encourage customers to engage with their products or services and become more familiar with their brand. By providing targeted educational content and assistance during the onboarding process, businesses can improve customer retention and increase the likelihood of future purchases.
- ✓ Customer targeting during the engagement stage can be effective, as businesses can use data analysis and AI and ML techniques to identify customers who are more likely to make repeat purchases or become brand advocates. By targeting these customers with personalized messages and offers, businesses can increase engagement and build customer loyalty.
- ✓ Targeting customers during the retention stage can be highly effective, as businesses can use data analysis and AI and ML techniques to identify customers who are at risk of churn and target them with personalized messages and offers to retain them. By providing exceptional customer service and addressing any issues or concerns that customers may have, businesses can improve customer satisfaction and loyalty.
- ✓ Targeting customers during the reactivation stage can be moderately effective, as businesses can use data analysis and AI and ML techniques to identify customers who have lapsed or churned and target them with personalized messages and offers to bring them back. By providing compelling reasons for customers to return, such as exclusive offers or new product features, businesses can increase the likelihood of reactivating these customers.

Interpretation: The effectiveness of customer targeting throughout the customer lifecycle will depend on the specific strategies used, the quality and quantity of the data analysed, and the accuracy and appropriateness of the AI and ML techniques used. However, businesses that incorporate these techniques into their customer targeting strategies are likely to see improvements in customer engagement, retention, and loyalty.

3. Challenges and ethical considerations around the use of customer data and privacy by using AI and ML
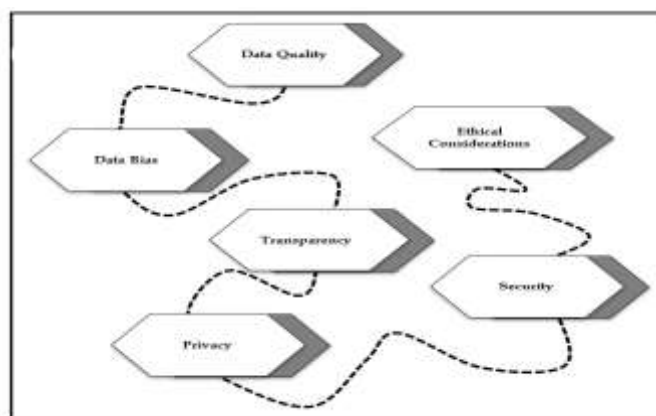

Figure 3: AI & ML based Challenges and ethical considerations for customer's data & privacy

724

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727

Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

The use of "artificial intelligence (AI) and machine learning (ML)" to predict customer preferences for marketing strategies raises several challenges and ethical considerations around the use of customer data and privacy. Analysis found the major challenges and ethical considerations:

- ✓ The accuracy of AI and ML algorithms depends on the quality of the data used to train them. Poor data quality can result in inaccurate predictions, which can negatively impact marketing strategies.
- ✓ "AI and ML" algorithms may be biased if the data used to train them is biased. This can result in unfair or discriminatory targeting of certain groups of customers.
- ✓ It may be difficult for businesses to explain to customers how AI and ML algorithms are being used to target them, which can erode trust and lead to concerns about privacy.
- ✓ Customers may be concerned about the use of their personal data for marketing purposes, especially if they feel that their privacy is being violated or that their data is being shared without their consent.
- ✓ The use of AI and ML for marketing purposes may increase the risk of data breaches or other security incidents, which can have serious consequences for customers and businesses alike.
- ✓ There are ethical considerations around the use of AI and ML to target customers, such as the need to balance the benefits of targeted marketing with the potential harm to individual privacy and autonomy.

Interpretation: In order to address these challenges as well as ethical considerations, businesses have a responsibility to ensure that they use customer data in a transparent and responsible manner. This includes being open and honest about how customer data is collected, stored, and utilized, as well as obtaining customers' express consent prior to using their data for marketing purposes, as part of this initiative. Additionally, businesses must ensure that their "AI and ML" algorithms are designed and trained in a way that is unbiased, accurate, and respects individual privacy and autonomy. Overall, the responsible use of "AI and ML" for marketing purposes requires a thoughtful and ethical approach that prioritizes customer privacy and security.

Findings of the study

The use of "artificial intelligence (AI) and machine learning (ML)" based approaches in predicting customer preferences for various marketing strategies has shown promising results.

Here are some of the key findings:

- AI and ML-based approaches can provide highly personalized marketing campaigns based on individual customer behaviour and preferences.
- These approaches can analyze vast amounts of data in real-time, providing more accurate and up-to-date insights compared to traditional methods.
- AI and ML-based approaches can provide more accurate insights by analyzing vast amounts of data from multiple sources, resulting in a better understanding of customer behavior and preferences.
- These approaches can be easily scaled to analyze large and complex data sets, allowing for a more thorough analysis of customer preferences.
- The use of customer data raises ethical considerations, such as data privacy and transparency, which need to be addressed to maintain trust with customers.

725

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727

Artificial Intelligence and Machine Learning Based Approach to Predict the Preferences the Target Customers for Various Marketing Strategies

Section A-Research paper

Recommendations:

- Based on the findings, here are some recommendations for businesses looking to use AI and ML-based approaches to predict customer preferences:
- Businesses must ensure that they are using customer data ethically and transparently, and provide customers with the option to opt-out of data collection and targeting.
- To take advantage of AI and ML-based approaches, businesses must build a robust data infrastructure that allows for the collection and analysis of vast amounts of data.
- To stay ahead of the competition, businesses must embrace real-time analysis of customer behaviour and preferences to provide up-to-date insights that can inform marketing strategies.
- AI and ML-based approaches provide an opportunity to focus on personalization, providing tailored marketing campaigns that meet the specific needs and preferences of individual customers.
- To effectively use AI and ML-based approaches, businesses must invest in talent and technology, including hiring data scientists and investing in AI and ML-based tools and platforms.

Conclusion

AI marketing segmentation provides businesses with the ability to create highly personalized and effective marketing campaigns based on real-time customer behavior and preferences. While traditional marketing segmentation remains a useful tool, AI-based approaches can offer a significant advantage by providing faster, more accurate, and more scalable insights. In conclusion, the findings suggest that AI and ML-based approaches can significantly improve the effectiveness of customer targeting and lead to higher customer engagement and satisfaction. However, businesses must ensure that they use customer data ethically and transparently and address ethical considerations to maintain customer trust. Overall, AI and ML can help marketers gain a competitive edge by delivering more personalized experiences, automating tasks, optimizing campaigns, and predicting customer behavior.

Future Scope

Artificial intelligence (AI) will enable the development of marketing analytics techniques that will help businesses better target consumers and provide a more customized experience for those who are already customers. Everything a potential buyer or current customer does with a product or service is tracked and stored so that it can be better tailored to their needs. The time will come when it is more cost-effective for marketers to test out AI strategies that can help them create unique and engaging content for their target audience. Marketers should invest time and energy into trying out new approaches and making sure their marketing infrastructure is ready for the long haul. This is crucial in light of the widespread expansion of AI across all markets and sectors.

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726

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727

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Section A-Research paper

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727

Eur. Chem. Bull. 2023, 12(Special Issue 4), 717-727